

Washington State On-Site Wastewater Technical Review Committee

Summary Minutes for the December 2-3, 1999 Meeting

Approved on March 3, 2000 by Vote of the Committee



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Washington State On-Site Wastewater Technical Review Committee

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MEETING ATTENDEES

Members Present

Dean Bannister
Kevin Barry
Clifford Bates
Scott Jones
Bob Monetta
Bill Peacock
Tom Rogers
Mike Vinatieri, Chair

Members Absent

Vacant Position

Guests Who Signed In

Bob Backman
Jim Bransfield, Infiltrator
James Donlin
Rein Laak
Rhys Sterling

Steve Wecker

DOH Staff

Wayne Turnberg, TRC Coordinator
Mark Soltman, Facilitator
Lisa Brown
John Eliasson
Selden Hall

INTRODUCTION –

The two day meeting (December 2-3, 1999) was called to order by Mike Vinatieri, Chair, at approximately 8:15 a.m. on December 2, 1999 (Day 1) and at approximately 8:30 a.m. on December 3, 1999 (Day 2) in the Elaine Wright Room of Munson Hall, Central Washington University, Ellensburg, Washington. The meeting began with brief introductions by each committee member. One vacancy continues to be unfilled, which has been historically held by a representative from the Department of Ecology. The Department of Health will continue efforts to fill this position before the next meeting scheduled for March 2-3, 2000.

SUMMARY OF TECHNICAL DISCUSSIONS

Composting Toilets – Wayne Turnberg presented the committee with the latest draft composting toilet RS&G, which includes revisions based on TRC 1) comments from the September 9-10, 1999 meeting, 2) comments from individuals who attended the Composting Toilet Draft RS&G Review forum which was held on November 19, 1999 at the Burien Public Library, and 3) written comments received from external reviewers.

- Motion/Recommendation by the Committee –
 - By general consensus, the TRC recommended that the DOH proceed with adopting the composting toilet section of the Water Conserving Onsite Wastewater Treatment Systems RS&G, with changes as noted during the discussion.

Recirculating Gravel Filters - Lisa Brown noted that from the last TRC meeting, a few outstanding issues remained to be resolved on the Recirculating Gravel Filter RS&G document before finalizing. Lisa provided a cover letter to highlight the individual items that were changed as a result of the September 9-10, 1999 TRC direction. Issues which were discussed during the meeting included:

Issue 1 - Regarding drainfield sizing following RGF, replacing section 3.7 “Disposal Component” to be consistent with references to “Recommended Standards and Guidance for Effluent Quality Based Drainfields

Issue 2 – Adding a requirement for redundant off in mixing tank. (Section 4.3.4-page 9 of 36 and Figure 3)

Issue 3 – Adding pump screen clarifying language on a system diagram

Issue 4 – Adding 10” and 12” diameter sizes to Table 1 for designing buoyant ball check valves per Dean Bannister’s request. (Section 4.4.2)

Issue 5 - Clarifying and modifying guidance for Splitter Basin (Section 4.4.2-page 15 of 36)

Issue 6 - Adding guidance and cautionary statements for the use of gravity flow from the mixing tank without the use of a splitting device. (Section 4.4.2)

Issue 7 - Adding provisions for a perimeter support frame to support the liner placement of the filter (Appendix B “Containment Vessel Standards”-page 25 of 36)

- Motion/Recommendation by the Committee –By general consensus, the TRC recommended the following actions to take place:
 1. Lisa will rework the first six issues as directed by the committee, and incorporate them into the final document without further review by the committee;
 2. With regard to the last issue, Lisa will rework that language with Dean Bannister, Scott Jones, and Bill Peacock, distribute the revision to the TRC for comment, revise the language based on TRC comment, and incorporate that language into the final document, again without additional review by the committee.

Stratified Sand Filters - Lisa Brown recommended to the committee not to do anything with the draft Stratified Sand Filter RS&G document at this time. Lisa reformatted the document so that it would be consistent with the formatting of the other documents. Lisa distributed the reformatted document to the committee members in preparation for discussion during the next TRC meeting.

Lisa has proposed three technical changes in the reformatted document, which involve:

1. Amending the document to include reference to "Recommended Standards and Guidance for Effluent Quality Based Drainfields" (Section 2.7)
2. Adding provisions for a perimeter support frame to support the liner placement of the filter (Appendix C "Containment Vessel Standards")
3. Venting changes. (Lisa noted that due to lack of available information to date, venting changes have not been made at this time and recommended deferring adoption of the revised stratified sand filter standards and guidance until additional information is obtained. The anticipated completion date is by next TRC meeting)

Lisa noted that the TRC, during its September 9-10, 1999 meeting, recommended that Lisa contact Mark Gross in Oregon who has expertise in area of SSF venting. Lisa has not yet been able to reach him, but will continue attempts to do so. Until additional information is obtained, Lisa recommends not changing venting standards in the document as it now stands.

- Motion/Recommendation by the Committee – None.
- Assignments – Lisa will continue developing the document for discussion during the next TRC meeting.

At-Grade Drainfield Systems – *[Note: The At-Grade Drainfield Systems RS&G development discussion the Septic Solutions At-Grade Experimental System discussion that occurred during this meeting are inter-related. Because the issues are inter-related, the reader should consider both discussions for a complete understanding of the discussions, actions, and recommendations that were made during these TRC meeting sessions.]*

At-Grade RS&G Development - At the September 9-10 TRC meeting Selden Hall gave a presentation on at-grade system technology which included responses to a number of technical issues that had developed during the TRC review. One outcome of that meeting was a list of questions. For the December 2-3 meeting, Selden prepared a response sheet to the questions developed at the September meeting. However, TRC discussion quickly drifted away from the prepared sheet, and the committee ended up feeling that they did not have sufficient information or understanding to proceed further with an RS&G for At-Grade systems.

Mike Vinatieri suggested that a small group be formed to work with Selden to describe what might be the committee's image of an at-grade system, the potential design, the intricacies, etc. In response, a small sub-committee was formed to develop responses to the technical issues identified and to develop a standard design package.

At-Grade Experimental System Proposal - The applicant, Bob Backman of Septic Solutions, seeks permission to install an "at-grade," gravity disposal component after a "Whitewater" ATU with disinfection which is capable of producing Treatment Standard 1 effluent, which would qualify for application on sites with 12 inches of vertical separation, in 30 applications in the Spokane/Tri-County Health District. The systems would be monitored for 2 years on a quarterly basis to determine proper operation of the system, observation in the monitoring ports (dry/wet), D Box observation, disposal component observation (dry/wet), 30 foot down slope observation (dry/wet), flow meter reading, and

gallons per day. The purpose of the experiment is to determine “disposal” ability. The “treatment” aspect of the system would not be under review.

Mike Vinatieri noted that there are some serious issues to resolve concerning at-grade systems in general, and suggested combining the efforts of the TRC’s At-Grade Sub-Committee efforts with the work proposed by Mr. Backman. Mike sees this effort as having two purposes: 1) it would allow the committee to address at-grade systems generically, and 2) how Mr. Backman’s proposal deviates from the TRC at-grade perspective, so that he has clear direction on how to proceed.

- Motion/Recommendation by the Committee -
 - By general consensus, the TRC agreed to the following approach:
 1. Selden Hall will assemble the TRC At-Grade Sub-Committee, and will get the information regarding the experimental system proposal out to them after it has been developed;
 - John Eliasson will coordinate with Bob Backman to identify sites for the experimental systems, timelines, etc.; (See Septic Solutions At-Grade Experimental Systems Proposal summary below)
 - John will then be in contact with the sub-committee members for their feedback on the proposal. Timelines for TRC responses will be established at that time;
 2. Selden Hall will provide the entire TRC some of the more recent information relating to At-Grade Drainfield Systems
 3. The TRC will review all At-Grade Drainfield Systems information submitted to them to date, which has been listed on a handout by Wayne Turnberg. This review will include any additional information provided by Selden following the meeting;
 4. Following these activities identified above, proposals will be developed for 1) the At-Grade RS&G development, and 2) the Septic Solutions Experimental System Proposal, and provided to the entire committee at its next meeting with the following goals for the committee:
 - To provide the DOH a recommendation with regard to the Septic Systems At-Grade Experimental Systems proposal;
 - To provide the DOH a recommendation to move the development of the At-Grade RS&G proposal forward, or to identify specific issues that would have to be addressed before an adoption recommendation can be made.

Joint Discussion - *Note: Although identified as individual discussions in these minutes, the discussions on Aerobic Treatment Units, Effluent Quality-Based Drainfields, Disinfection Methods and Equipment, and BOD₅ vs. CBOD₅ were presented during the same TRC session, and are inter-related. Because the issues are inter-related, the reader should consider all four discussions for a complete understanding of the discussions and actions that took place during this TRC meeting session. These discussions are summarized as follows:*

- **Aerobic Treatment Units** – Mark Soltman distributed a summary of comments received from external interested reviewers on the draft ATU RS&G document. Remaining issues were discussed by the committee.
 - Motion/Recommendation by the Committee – By general consensus, the TRC recommended the following activities to take place:
 1. Mark will draft testing protocol and performance standard language for Category 3 ATUs for review by the TRC during its next meeting.
 2. The issue of BOD₅ vs. CBOD₅ will be further addressed during the next TRC meeting.

- **Effluent Quality-Based Drainfields** – Mark Soltman distributed a summary of comments received from external interested reviewers on the draft Effluent Quality-Based Drainfields RS&G document. Remaining issues were discussed by the committee.
 - Motion/Recommendation by the Committee –
 - By unanimous vote, the TRC recommended that the current draft of the Effluent Quality-Based Drainfield RS&G document be adopted with inclusion of the simplified Table 1, revised as noted in the minutes.
 - By consensus, the TRC recommended that the DOH continue research on the question of drainfield size reductions for systems meeting NSF Class 1 criteria (Table 1, Column D).
- **Disinfection Methods and Equipment** - Mark Soltman distributed a summary of comments received from external interested reviewers on the draft Disinfection Methods and Equipment RS&G document. Remaining issues were discussed by the committee.
 - Motion/Recommendation by the Committee –
 - By general consensus, the committee agreed that the following activities should occur:
Mark will remove the strikeouts from the existing draft document
That document will be sent to TRC members for suggestions on how to further pare down the document, and for additional feedback
A comment due date will be established in a cover letter from Mark when he sends out the document.
- **BOD₅ vs. CBOD₅** – Wayne Turnberg presented the committee with an issue paper with the following problem statement: For an ATU to be listed by the DOH as meeting Treatment Standard 1 or 2, it must demonstrate the ability to treat wastewater to produce an effluent meeting a thirty-day average of less than 10 milligrams per liter of biochemical oxygen demand (five day BOD₅). According to the DOH's Recommended Standards and Guidance for Aerobic Treatment Units, ATUs must be tested according to the product standards and testing protocol established by the National Sanitation Foundation in the NSF Standard No. 40 Residential Wastewater Treatment Systems. The NSF protocol currently calls for a five-day carbonaceous biochemical oxygen demand test (CBOD₅). This is in conflict with the BOD₅ testing parameter required for meeting Treatment Standard 1 & 2 criteria under the state's onsite wastewater standard, Chapter 246-272 WAC.

Due to a lack of time, it was the consensus of the committee to table this discussion until the next TRC meeting.

- Motion/Recommendation by the Committee –
 - By general consensus, the committee agreed to table this discussion until its next meeting.
- Assignments –
 - The TRC will read the BOD₅/CBOD₅ issue paper in preparation for the discussion during the next meeting.
 - Wayne will provide the committee with supporting documents identified in the issue paper's reference section.

Experimental Systems -

- **Process for Experimental Systems Review and Approval – Administrative Overview**
John Eliasson presented an overview to the committee on the Department of Health's Experimental Systems process. One handout was provided to graphically describe the process.

- **Septic Solutions At-Grade System – Experimental System Application** – See summary under At-Grade Drainfield Systems above.
- **UV “The Disinfector” – Experimental System Listing Status Report** – Ken Moody updated the committee on the status of NSF testing of the UV “The Disinfector”, Inc. ultra-violet disinfection equipment in conjunction with a Delta Whitewater ATU system, and his request for the DOH to grant Treatment Standard 1 approval of this system. Testing is expected to be completed by mid-December, 1999, and DOH approval is expected shortly after that.
- **Eljen In-Drain – Experimental System Application** - The applicant, Eljen Corporation, has proposed an experimental system protocol for the Eljen In-Drain System which would involve installing In-Drains for residential-type use only, gravity flow and/or pressure distribution systems with design flows not exceeding 3,500 gpd. As proposed by the applicant, a total of 18 In-Drain Systems would be installed for purposes of this experiment in the State of Washington. Each system would be monitored for a full 18 months from date of initial operation of each system. A variety of soil types would be selected with the goal of having at least one In-Drain System installed in each type of soil classification as well as a mix of gravity flow and pressure distribution. The applicant proposes to size Eljen In-Drain system based on a 60% drainfield size reduction.

During the meeting, the Eljen Corporation representatives presented the committee with the Eljen In-Drain application package, which consisted of several hundred pages of information. Discussion followed, and by general consensus, the TRC recommended the following activities to take place:

- Motion/Recommendation by the Committee –
 - By general consensus, the TRC recommended the following actions:
 1. The TRC will take back with them and review the materials presented by the Eljen Corporation. This will include additional information on fecal coliform data which will be sent by Eljen to Wayne for transmittal to the TRC following the meeting;
 2. The TRC will provide written comments on the proposal to Wayne by January 15, 2000. Wayne will remind the committee of this deadline during the first week of January;
 3. The DOH will compile the comments into a summarized format. Comments will be presented both as a compiled summary and in their original form. Comments will be made available to the TRC and Eljen;
 4. DOH will schedule a meeting with Eljen to discuss the comments and to work out issues and details of the proposal;
 5. The revised proposal, along with any outstanding issues, will be brought to the TRC for discussion during its next scheduled meeting.

ADMINISTRATIVE/OTHER ISSUES

September 9-10, 1999 Meeting Minutes Adoption – By unanimous vote, the committee approved the May 9-10, 1999 TRC meeting minutes without changes.

Upcoming TRC Vacancies – One vacancy remains on the TRC which has traditionally be held by a representative from the Department of Ecology. Two individuals from Ecology have expressed an interest in serving on the TRC and will be interviewed by DOH.

Next Meeting – The next TRC meeting is scheduled for March 2-3, 2000 in the Tamarack Room of Courson Conference Center, Central Washington University, Ellensburg, Washington.

MEETING MATERIALS

Administrative/Other Materials

- Meeting Agenda, December 2-3, 1999
- Draft TRC Meeting Minutes – September 9-10, 1999

Composting Toilets

- Draft RS&G – Water Conserving On-site Wastewater Treatment System, Subpart A1, Composting Toilets [Final Draft Revision].

Recirculating Gravel Filters

- Memo from Lisa Brown to the TRC, 2-12-99, Re: Revisions to Standards and Guidance – Recirculating Gravel Filters and Stratified Sand Filters
- Washington State Department of Health. Recirculating Gravel Filter Systems – Recommended Standards and Guidance for Performance, Application, Design and Operation & Maintenance. Olympia, Washington. Draft document prepared by Lisa Brown, printed on November 29, 1999 (File RGFILT06).

Stratified Sand Filters

- Memo from Lisa Brown to the TRC, 12-2-99, Re: Revisions to Standards and Guidance – Recirculating Gravel Filters and Stratified Sand Filters
- Washington State Department of Health. Stratified Sand Filter Systems – Recommended Standards and Guidance for Performance, Application, Design and Operation & Maintenance. Olympia, Washington. Draft document prepared by Lisa Brown, printed on November 29, 1999 (File SSFILT05).

At-Grade Drainfield Systems

- At-Grade: Remaining Issues (12-1-99)
- At-Grade Soil Absorption Systems – TRC Meetings – List of Supporting Information

Joint Discussion:

Aerobic Treatment Units

- Aerobic Treatment Units – Draft RS&G, Printed 11/30/99, File Name: ATU_20a.doc
- Category 3 Aerobic Treatment Units – Is There a Comparable Level of Treatment (DOH Issue Paper)
- Summary of Responses – Aerobic Treatment Units, Printed 11/30/99, File Name: com99_3atu.doc

Effluent Quality-Based Drainfields

- Effluent Quality-Based Drainfields – Draft RS&G, Printed 11/30/99, File Name: E_Qlty02.doc
- Proposed Change from Randy Darst – 2.1. Permitting (Meeting Handout – 12/3/99)
- Proposed Revised Table I – Drainfield Sizing Allowances and Distribution Methods, by Pre-Treatment Levels and Vertical Separation (Meeting Handout – 12/3/99)
- Comments Regarding Reduced Size Drainfields Following NSF Class I Aerobic Treatment Units [Nationwide survey of state health departments] (Meeting Handout – 12/3/99)
- Summary of Responses – Effluent Quality-Based Drainfields, Printed 11/30/99, File Name: com99_3atu.doc

- NSF Class I ATU – Rejuvenation of Failed Drainfields by ATU Treated Effluent and Possible Drainfield Size Reductions (DOH Issue Paper)

Disinfection Methods and Equipment

- Disinfection Methods and Equipment – Draft Interim RS&G, Printed 11/30/99, File Name: INTDIS04.doc
- Summary of Responses – Disinfection Methods and Equipment, Printed 11/30/99, File Name: com99_3atu.doc

BOD₅ vs. CBOD₅

- BOD₅ vs. CBOD₅ – Draft, November 30, 1999 (DOH Meeting Handout – 12/3/99)
- BOD₅ vs. CBOD₅ – Revised Draft, December 12, 1999 (Mailed to the TRC on December 16, 1999 with references identified below)
- List of References
 - WAC 246-272-01001 [Definitions].
 - American National Standard/NSF International Standard. Residential Wastewater Treatment Systems. ANSI/NSF 40. 1999.
 - American Public Health Association, American Water Works Association, Water Environment Federation. *Standard Methods for the Examination of Water and Wastewater, 19th Edition*. Washington, D.C. 1995.
 - Metcalf & Eddy, Inc. *Wastewater Engineering – Treatment, Disposal, and Reuse, Third Edition*. Mc-Graw Hill, Inc. 1991.
 - Carter KB. Monitor – 30/30 Hindsight. *Journal WPCF*, 56(4):301-305. 1984.
 - Manoharan R. Investigation of Total BOD₅ Versus Carbonaceous BOD₅ as a Monitoring Parameter for Sewage Treatment Works Performance and Compliance. Ontario Ministry of Environment and Energy. June 1994.
 - McDermott GN. Letters – Nitrification in the BOD₅ test. *Journal WPCF*, 56(4):300. 1984.
 - Hall JC and Foxen RJ. Nitrification in BOD₅ test increases POTW noncompliance. *Journal WPCF*, 55(12):1461-1469. 1983.
 - U.S. Environmental Protection Agency. *Federal Register*, 49(184):36986-37014. September 20, 1984.
 - Anderson DL, Tyl MB, Otis RJ, Mayer TG, and Sherman KM. Onsite wastewater nutrient reduction systems (OWNRS) for nutrient sensitive environments. Proceedings of the Eighth National Symposium on Individual and Small Community Sewage Systems, Orlando, Florida, pp. 436-445. March 8-10, 1998.
 - U.S. Code of Federal Regulations. 40 CFR 133.102
 - Washington Administrative Code. WAC 173-221-050(6)

Experimental Systems:

Process for Experimental Systems Review and Approval – Administrative Overview

- Experimental Systems Flow Chart

Septic Solutions At-Grade System – Experimental System Application

- Experimental Systems Application – Bob Backman – October 7, 1999
- Response Letter from John Eliasson (DOH) to Bob Backman – October 20, 1999
- Revised Experimental Systems Application – Bob Backman – November 29, 1999

UV “The Disinfector” – Experimental System Listing Status Report

- Letter from Ken Moody to the TRC – November 10, 1999

Eljen In-Drain – Experimental System Application

- Eljen In-Drains Installation Video
- Eljen In-Drain System – Product Brochure
- Eljen In-Drains – Treatment Data, which includes the following documents and correspondence:
 - Rhode Island – Eljen In-Drain Sampling Data Sheet
 - New Hampshire – Eljen In-Drain Sampling Data Sheet
 - Pennsylvania – Eljen In-Drain Sampling Data Sheet
 - Letter from Hank Huber (Huber Designs, Inc.) to Jim Donlin transmitting the Spring 1999 In-Drain System Performance Report to the New Hampshire DES, November 10, 1999 (copy of the report is attached)
 - Letter from Robert Minicucci, Innovative Technology Coordinator, New Hampshire Department of Environmental Services to Hank Huber, December 18, 1998
 - Letter from Steve McCann, Subsurface Systems Bureau, , New Hampshire Department of Environmental Services to Mr. Huber, August 28, 1996
 - Letter from Hank Huber to William Evans, NHDES, March 14, 1996
 - Letter from Sam J. Argento, SaCon Environmental to “To Whom It May Concern,” November 15, 1999
 - Eljen-In-Drain Passive Pre-Treatment and Disposal System – Annual Performance Report. Prepared for the State of Rhode Island, Division of Ground Water and ISDS, September 1998 – September 1999.
- Eljen Corporation In-Drain Experimental System Application – December 2, 1999, which includes the following information:
 - Cover letter from Rhys Sterling to Mark Soltman – December 2, 1999
 - Experimental System Review Application
 - Tab 1. Application General Information
 - Tab 2. Introduction and General Product Description
 - Introduction
 - In-Drain Leach Field System
 - Fabric Surface Area Calculations
 - Washington State / In-Drain Sizing Chart
 - Eljen In-Drain Promotional Brochure
 - Tab 3. Regulatory Review Criteria
 - WAC 246-272-05001
 - Proposed Experimental Demonstration Project Program (5/22/97)
 - Tab 4. Theoretical and Applied Bases for In-Drain System and Supporting Research and Publications
 1. Laak, R. 1966. *The Effects of Aerobic and Anaerobic Household Sewage Pretreatment on Seepage Beds*. Doctoral Dissertation, University of Toronto.
 2. Civil Engr. Dept. 1973. *Wastewater Disposal Systems in Unsewered Areas. Final Report to State of Connecticut*. Grant RSA 70-22 Univ. of Connecticut.
 3. Laak, R. 1970. *Influence of Domestic Wastewater Pretreatment on Clogging*. J. Water Pollution Control Federation 42 (8) Part 1, 1495-1500.
 4. Healy, K. A. and R. Laak. 1974. *Site Evaluation and Design of Seepage Fields*. Env. Eng, Div., Amer. Soc. Civil Engr. 100 (EES): 1133-1146.

5. Kropf, F., Healy and R. Laak. 1975. *Soil Clogging in Subsurface Absorption Systems for Liquid Domestic Wastes*. Progress in Water Technology. Pergamon Press. 767-774.
6. Laak, R. 1976. *Pollutant Loads from Plumbing Fixtures and Pretreatment to Control Soil Clogging*. J. of Environmental Health 39 (1) July-Aug.
7. Tyler, E. J., R. Laak, et al. 1977. *The Soil as a Treatment System*. Proc. ASAE, 2d National Conference, Chicago. Dec.
8. Kropf, F., R. Laak and K A- Healy. 1977. *Equilibrium Operation of Subsurface Absorption Systems*. J. Water Pollution Cont Fed. 49 (9):20-07.
9. Laak, R. 1984. *In-Drain Tests*. Civil Eng. Dept, University of Connecticut.
10. Laak R. 1987. *On-Site Wastewater Drain Fields Using Light-weight In-Drains*. Proc. International Conf. , Cold Regions Env. Eng., Edmonton, Canada.
11. Laak R. 1988. *Using In-Drains at Soil Clogging Infiltration Surface*. ASAE, Rapid City, South Dakota.
12. Laak, R. 1988. *Using In-Drain Geosynthetics in Soil Infiltration Systems*. ASAE, International Meeting, Quebec, Canada. Paper No. 892176, June.
13. Laak, R. 1990. *Use of In-Drains vs. Conventional Systems*. Unpublished Research Paper.
14. Jennsen, P. D., and Siegrist, R. L. 199 1. *Integrated Loading Rate Determination for Wastewater Infiltration System Sizing*. ASAE Publ. 10-91.
15. Laudon, T. L. and Birnie, G. L. 199 1. *Performance of Trenches Receiving Sand Filter Effluent in Slowly Permeable Soils*. ASAE Publ. 10-91.
16. Amerson, R. S., E. J. Tyler and S. C. Converse. 1991. *Infiltration as Affected by Compaction, Fines and Contact Area of Gravel*. ASAE Publ. 10-9 1.
17. Laak, R, 1995 (Update). *Long Term Performance Characteristics of Geotextiles Utilized for Subsurface Drainage*. Unpublished Technical Reports (Update and Original).
18. Laak,R. 1996. *Washington State Eljen In-Drain Approval Information*. Correspondence.

Tab 5. In-Drain Materials Specifications

- Plastic and Fabric Technical Specifications
- Under-Wheel Loading Research

Tab 6. Installation, Design, Operation and Maintenance Instructions / Manuals

- Installation and Design Manual
- Homeowners Manual

Tab 7. Proposed Experimental System Protocol: Number of Installations, Duration, Testing, Monitoring

- Eljen Corporation's Experimental System Protocol
- Draft Letter from John Eliasson to James Donlin – April 17, 1998
- Letter from John Eliasson to James Donlin – March 12, 1998
- Memorandum from Tom Long Re: Review of Eljen In-Drain Model SLTB – October 20, 1997
- Washington State / In-Drain Sizing Chart
- Observation Port Installation

Tab 8. State Approvals of Eljen In-Drain System

- State of Alabama Department of Public Health – October 27, 1998
- Commonwealth of Kentucky – December 3, 1997
- State of Maine –
 - March 1, 1994
 - March 28, 1996

- State of New Hampshire –
 - December 14, 1992
 - June 13, 1995
 - State of New York – March 29, 1999
 - State of Pennsylvania – November 4, 1997
 - State of Rhode Island – July 18, 1995 / April 28, 1997
 - Commonwealth of Virginia – January 8, 1998
 - State of West Virginia – October 5, 1999 / August 28, 1996
- Tab 9. Department of Health Questionnaire Results as to Performance of Eljen In-Drain Systems in Other States and Various Performance Reports
- Eljen In-Drain in Other States (Interview Responses)
 - New Hampshire
 - Maine
 - West Virginia
 - Rhode Island
 - Letter from Hank Huber (Huber Designs) to William Evans (New Hampshire DES) – 9/24/96
 - Letter from Steve McCann (New Hampshire DES) to Mr. Huber (Huber Designs) – August 28, 1996
- Tab 10. Installations of Eljen In-Drain Systems in the State of Washington
- Applicant: Jim Lubke, Centralia, WA – September 1996
 - Property Owner: Patrick Phelan, Skagit County – August 1998
 - Property Location: Burnett, WA – November 1998
- Tab 11. Locations and Uses of Eljen In-Drain Systems
- General Criteria for Siting Washington State Experimental Systems
- Tab 12. Financial Responsibility and In-Drain System Warranty
- Eljen Financial Responsibility Statement
 - Eljen Corporation Operational Plan for the State of Washington
 - Policy Statement – Use of Eljen In-Drains in Conjunction with Aerobic Treatment Plants
 - Eljen In-Drain Warranty Certificate of Registration
- Tab 13. Operation, Maintenance, Monitoring, Reporting: Details and Schedules
- Tab 14. Schedule for the Experimental System Program
- 18 In-Drain Systems / 18 Months Minimum
- Tab 15. Verification of Experimental System Proposal's Consistency with WAC 246-272-5001(1)(I)

TECHNICAL DISCUSSION ATTACHMENTS¹

If you wish to obtain copies of the Technical Discussion Attachments, please contact Wayne Turnberg, TRC Coordinator, either by telephone [206-522-0132], fax [206-528-9839], or email [wayne.turnberg@doh.wa.gov].